FORESIGHT DEVELOPMENT AND IMPLEMENTATION EFFECTIVENESS: LESSONS FROM THE BRAZILIAN EXPERIENCE

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Extended abstract

Keywords: foresight, public policy, sustainable development, stakeholders, prospective

Introduction

This paper presents the results of a research whose purpose was to investigate and extract learnings from the Brazilian experience of developing foresight studies, and to learn how this process influences their implementation efficacy and the public policy formulation process . Furthermore, it shows how these studies were prepared, how the stakeholders took part in it and what stage Brazil is at where preparing such studies is concerned. Objectively and concisely, but in depth, it presents the case study of the Brazilian Program of Industrial Technological Foresight, coordinated by the Industrial Technology Department (*STI – Secretaria de Tecnologia Industrial*) along with the Production Development Department (*SDP – Secretaria de Desenvolvimento da Produção*) of the Ministry of Development, Industry and Commerce (MDIC) of Brazil.

Methodology

This is an exploratory research study based on the case study method. Bibliographic and documentary surveys were conducted, and people who took part in the development of the Brazilian foresight studies were interviewed. These interviews followed a semi-structured questionnaire and yielded the primary data. A research model was then developed, taking into account the independent and the dependent variables. The chosen unit of analysis was the Brazilian Program of Industrial Technological Foresight, which was coordinated by the STI along with the SDP of the MDIC. This case was selected because it was one of the pioneering nationwide studies of its kind and because it encompassed four foresight studies, of which three were completed and published. These studies covered Production Chains that form part of an organization called the Production Chains Competitiveness Forum. The coordinator of the program, the consultants of the three phases and also all the coordinators of each foresight study were interviewed.

Results and policy impact/implications

The research showed that the impact of these Foresight Studies was clearly linked to the approach used for developing them. In order to help to fine tune the development of future foresight studies, not only the positive results, which aided the country's development, are presented here, but also those that provide learnings derived from the studies' shortcomings. The positive outcomes, in sum, were: the results of the foresight study of the Civil Construction Production Chain, which indirectly contributed to the preparation of Resolution

3177/2004 of the Central Bank of Brazil and of Law 10931/2004; the development of the Seminar "Corporate Strategies, Brazilian Industrial Policy and New Approaches to Promoting Competitiveness" for enterprises, held at the São Paulo State Federation of Industries (FIESP), mainly for decision-makers; and the importance ascribed to its foresight study by the Competitiveness Forum of the Production Chain of Transforming Plastic Goods, which formed the basis for forecasting demand in that sector. To help improve the development process of Brazil's foresight studies, some of the circumstances that possibly impaired the results of the Program's foresight studies were then listed: (a) the change of focus, as from the second stage, in the performance of the foresight studies of the Competitiveness Forums' Production Chains as compared to the ACTION PLAN (2000) prepared in the first stage; (b) the failure to take sustainable development into account in the objectives of these studies; (c) the inability to establish networks, which was one of the concerns of the ACTION PLAN (2000); and (d) the failure of the prospective studies to: properly deal with the issues of continuity in the process of implementing these results; achieve absorption of the foresight concept by the business sector; and be included in the formulation of public policies for the Production Chains studied.

Conclusions

One concludes that, both in the Brazilian Program of Industrial Technological Foresight and in the foresight studies of each Production Chain, the way in which their development was conducted did not produce the desired effects; in other words, unlike what happens in the European Union and in its countries, these studies did not become a tool for the formulation of public policy concerning science, technology and innovation. One should highlight, however, that the Civil Construction Production Chain foresight study indirectly helped to generate a resolution and a law. The Brazilian government had difficulty using the foresight studies' results to formulate public policies, mainly because it was difficult get the stakeholders involved in the studies' development process. As this takes time, it requires systematic continuity and persistence, as the European Union has shown in its many foresight studies of the last few years. One must also highlight that the foresight studies did not take into account sustainable development equally in terms of its economic, social and environmental dimensions.

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Sumary

This paper presents the partial results of an empirical study conducted during the development of a Ph.D. thesis, using the case study approach. The research aimed at understanding how a large scale Foresight Study supported by the Brazilian Government was managed and conducted, and how effective this managerial approach was, where implementing the Study's recommendations was concerned. To conduct the research, a model considering the relationship between the Foresight Study's planning and implementation phases was designed. The case study focuses on the Brazilian Program of Industrial Technological Prospective (*Programa Brasileiro de Prospectiva Tecnológica Industrial*) coordinated by the Department of Industrial Technology and the Department of Production Development of the Ministry of Development, Industry and Foreign Trade. The investigated Foresight Study is a pioneering effort in Brazil and comprises three finalized prospective studies (out of the four originally intended) involving the main Brazilian Productive Chains. Besides relying on published data, a lot of first-hand information was collected through interviews with the main players involved with the Foresight Study, such as the Program Coordinator and the Coordinators of each one of the three productive chains studied. Some of the important consultants that took part in the Foresight Study were also interviewed. One of this survey's major findings was evidence of the importance of including the participation of all key stakeholders during all of the foresight study's processes. In this paper, certain relevant suggestions and recommendations that represent lessons learned are provided for academicians and practitioners, to further the progress of knowledge about the management of prospective studies.

Keywords: foresight, public policy, sustainable development, stakeholders, prospective

1. Introduction

Foresight studies are processes that systematically try to prospect the long-term outlook for science, technology, the economy, the environment and society, in order to identify emerging technologies and strategic research areas that will lead to economic and social benefits, according to MARTIN (2001, p. 5). Despite the complexity of foresight studies and the time needed for carrying them out and complete them, the information supplied helps with the decision-making process and the formulation of public policies, and furthermore, leads to the establishment of networks between the participants and improvements in the relationship between stakeholders, as a result of which the expenses for carrying out the exercise are not representative and are seen as an investment. These facts can be seen in the European Union and its member-countries, in Canada and elsewhere.

The importance of the foresight study preparation process is to provide support for public policies, in addition to bringing together those taking part in this process, the experts and the stakeholders.

In Brazil, national foresight studies began in 2000 with an experimental study called *PROSPECTAR*, which chose eight themes to be studied. Besides this study, the Brazilian Program of Industrial Technological Prospective, which was coordinated by the Department of Industrial Technology (*DIT*) of the Ministry of Development, Industry and Foreign Trade (*MDIFT*), in portuguese *Ministério de Desenvolvimento, Indústria e Comércio Exterior (MDIC)* sponsored by the United Nations Industrial Development Organization (UNIDO) and which concluded three productive chain studies, was implemented. In these studies in Brazil, the experts coordinated specific topics and the stakeholders participated indirectly; there was no

possibility for integration or for forming networks and consequently there was no commitment to the results.

On a national plane, the Center for Management and Strategic Studies (*CMSS*) in portugues *Centro de Gestão e Estudos Estratégicos (CGEE)* is the body that prepares foresight studies. The *CMSS* collaborates with the Center for Strategic Affairs (*CSA*) in portuguese *Núcleo de Assuntos Estratégicos (NAE)*, which is responsible for the ongoing Brazilian study, *Brasil 3 Tempos* (Brazil 3 Times)

The objective of this paper is to show, in a summarized form, where Brazil stands in the preparation of foresight studies and to look at the Brazilian Program of Industrial Technological Prospective' case study, coordinated by the *DIT* in Portuguese *(STI)* and the Department of Production Development (*DPD*) of the Brazilian *MDIFT.* This work identifies how the process for preparing a foresight study in Brazil develops and how the effectiveness of its implementation influences the formulation of public policies. Furthermore, it shows how it was prepared and the part the stakeholders played in the process.

2. Theoretical Background

Rand Corporation researchers developed the Delphi technique in the 1950s to obtain information about the future of technology, according to RINGLAND (2002, p. 83).

From the point of view of future studies, in national terms, the forecast model lost strength and was gradually replaced by the foresight model. This evolution can be seen in Japan, which during the 1970s, according to MARTIN (2001, p. 1), started doing foresight studies in its national planning, although these studies were not described as foresight, but as forecasting, or long term strategic planning, or the like.

MARTIN (2001, p. 5) defines foresight as a **process** that **systematically** tries to look to the **long term** future of science and technology, **the economy, the environment and society,** with the aim of identifying the **generic emerging technologies** and the areas for strategic research with potential for producing greater **economic and social benefits**. Unlike foreseeing the future, this definition tries to identify technologies and areas for strategic research through a systematic process.

The evolution of foresight studies in the European Union led to the need for creating the *Foresight for Regional Development Network* (FOREN) (2001), which tries to show the importance of preparing foresight studies, a term that is now widely used to describe a huge range of approaches, whose objective is to improve the decision-making process. In foresight studies, it is important that key players for change and those who are a source of knowledge take part in order to develop a strategic vision and anticipatory intelligence; they are also used to establish networks of knowledge agents that can respond to public policies and other challenges. According to FOREN (2001), one of the main lessons that foresight studies have provided so far is that the increase of science and technology is inextricably linked to a broad variety of social factors, and vice-versa. Social forces have an influence on the development and use of science and technology, and on the social implications associated with the latter.

For FOREN (2001), foresight involves five essential elements:

- Anticipation and structured forecasts about long-term social, economic and technological development and needs.
- Interactive and participative methods of exploratory debate, analysis and study, involving a wide variety of stakeholders, are also characteristics of foresight, unlike many traditional future studies, which tend to preserve experts' opinions.

- These interactive approaches involve *generating new social networks*. The emphasis on the network role varies from one foresight study program to another. The network is often considered on a par with, or even more important than, the formal products generated by foresight studies, such as reports and action lists.
- The formal products generated by the foresight study go beyond the presentation of scenarios (though they may stimulate these scenarios) and the preparation of plans. What is crucial is the preparation of a guide of the *strategic vision*, so that a shared sense of commitment can be achieved (in part, by network processes).
- This shared vision is not Utopian. There is an explicit recognition and explanation of the implications for the *decisions and actions of current times (today)*.

For GODET (2001, p. 9), one must not confuse prospecting with projecting. Prospecting is anticipation for guiding actions, which implies an interest in seeing "far, broadly and in an in-depth way", but also in seeing in a different way and looking at the whole. Projection, on the other hand, is prolonging or inflecting past tendencies into the future.

2.1. Institutional structure needed for carrying out foresight studies

Before preparing the foresight study process it is important to identify to which organism within the government structure it should report to and whether that should be national or regional. Structure identification is important to ensure the foresight study is close to the decision makers, in order to support the definition of priorities and help in the formulation of public policies.

In order to survive and prosper in a volatile world, the organization needs environment-sensitive management, according to GEUS (1998, p. 10-15). It should have some leading managers, who are attuned and sensitive to the world in which they live, to the point of playing an active role in this external world, because internal observers within the organization are necessary but few envisage the forces that will affect the future of their organization.

Just as in any organization, the country, in its structure, needs organs, whose responsibility is sustainable development and a concern with the future and which should be close to government decision-makers. In this way, they will provide the country with greater competitiveness.

In the examples of institutional structure supplied by SU (2003) and NISTEP (2001) one sees that in some countries the body that defines priorities and formulates public policies is linked directly to the person running the country. This structure shows the importance that leader, as the country's decision-maker, gives to the definition of priorities and the formulation of public policies.

2.2. Techniques and methods used in foresight studies

Once it has been defined which government organism the preparation of the foresight study will report to, one defines the mix of objectives and identifies the restrictions (government budget, time and other limitations). Because of this strong interdependence between objectives and restrictions, the main discussion is about the choice of methodologies that best meet the different types of objectives proposed by whoever is requesting the study.

GAVIGAN and SCAPOLO (1999, p. 497-498) believe that future research involves both exploratory as well as normative methods and that it can produce results of both a quantitative and a qualitative nature. Exploratory results are normally synonymous with a

plausible future and normative results with a desirable future. The exploratory method uses the past and the present as its starting point and moves towards the future heuristically, often looking at all available possibilities. The normative method begins in the future, by determining the objectives and future goals, and then works from the future to the present to see if the objectives and goals can be achieved, considering the restrictions, resources and technology available. Table 1 highlights the main techniques and methods.

Table 1: Main techniques used for preparing a technological foresight study

CRITERIA	METHODS – TECHNIQUES
Methods and techniques are based on extracting knowledge from experts to develop the long term future.	•*Delphi* •Expert panels •Brainstorming •Constructing scenarios •SWOT analysis
Methods and techniques that use statistics and other means.	•Extrapolation of trends •Modeling and simulating •Cross impact analysis • System dynamics
Methods and techniques for identifying key-points for determining ways of planning.	•Critical/key technologies •Relevance trees •Morphological analysis
Multicriteria methods and techniques, whose objective is to facilitate decisions concerning a problem, when multiple and different points of view must be taken into account.	•PATTERN method •ELECTRE method •MACBETH method •MULTIPOL method

SOURCE: AULICINO and KRUGLIANSKAS (2004).

For this work in Brazil, two approaches, used in Embrapa's Brazilian Program of Industrial Technological Prospective, according to CASTRO *et al.* (1996, p. 181), and in the Construction of GRUMBACH Scenarios, according to MARCIAL and GRUMBACH (2002, p. 105-127), stood out.

2.3. The Political System

Within the context of using foresight study results as support for formulating public policies, the political system is fundamental where preparing and putting together foresight studies is concerned, although this paper does not aim at studying in depth the political theme because of the breadth of this subject. Nonetheless, it is important to know the conceptual evolution both of politics and of comparative politics, especially the latter, because systems theory's influence upon it.

Starting with the analysis of CHILCOTE (1998, p. 168 e p. 170), one can see the importance of foresight studies in a country or region, in terms of providing support for the formulation of public policies. One might say that the definition of foresight from MARTIN (2001) agrees with the social scientists, who look at the future and propose actions for dealing with it.

2.4. The situation of foresight studies in Brazil

Brazil began concerning itself with the planning of Science & Technology (S&T) in national terms in 1973, but until September 2000, according to the *MST* (2003), no national foresight study had ever been carried out. There were several future studies, but they were only sector-

based and, more specifically, related to state-owned companies. Future studies began in the 1970s and four of them were considered relevant, but they were either regional or local studies.

These are not the only foresight studies carried out in the country. In 1996, the experimental future study done by the now-defunct Department of Strategic Studies (*DSS*), of the President's Office, constructed future scenarios for Brazil until 2020, with an intermediary assessment in the year 2005. But these experiments were insufficient to consolidate the position of foresight studies in Brazil.

The Ministry of Science and Technology (*MST*) created the Center for Management and Strategic Studies (*CMSS*) to aid the formulation of public policies through future studies and prospective activities; this was approved at the National Conference of Science, Technology and Innovation in September 2001.This is how institutional support for Technological Foresight studies, overseen by the *MST* and the National Council for Science and Technology (*NCST*), is consolidated.

At the same time, two future studies were being carried out: *PROSPECTAR,* coordinated by the *MST,* and the Brazilian Program of Industrial Technological Prospective, coordinated by the *DIT* of the *MDIFT*, sponsored by the United Nations Industrial Development Organization (UNIDO).

PROSPECTAR had eight themes, but was never completed. For each theme one or a group of institutions was designated, which presented reports containing results from the application of the *Delphi* technique.

In the Brazilian Program of Industrial Technological Prospective, four productive chains were studied; these were chosen by the Competitiveness Forums, which are coordinated by the Department of Production Development (*DPD*). According to the *MDIFT* (2004), of the four future studies, three were concluded and published.

Besides these studies, what stands out at the national level is the Oil and Gas sector prospective study, started in 2001 and ended in 2003. It was called the *Trends Project* and its objective was to construct an agenda of R&D priorities (TREND PROJECT - 2003). This study produced sixteen publications.

The most recent future study is Brazil 3 Times, 2007, 2015 and 2022, in accordance with the BRAZIL 3 TIMES PROJECT (2004, p. 9); the project established the bases of joint action between the State and society, in the sense of achieving cooperation (organized as a national project) in the form of a set of goals and objectives that are consolidated within the nationally agreed prospective scenario. Starting from this point future studies were carried out by renowned universities skilled in analyses in their various fields, according to BRAZIL 3 TIMES (2007). In analyzing the reports produced by these centers, one sees that foresight studies in Brazil are conservative and depend only on experts. Society's representatives did not take part and have not given their opinion either, so far. Therefore, just as with the other future studies that were prepared, this project's objective will not be achieved. They were prepared in a traditional way, preserving the opinions of the experts, and they were neither interactive nor participative.

In analyzing the Brazilian foresight studies carried out on a national level, in accordance with the MST (2003), AULICINO and KRUGLIANSKAS (2004), TREND PROJECT (2003), CMSS (2004), MDIFT (2004), BRAZIL 3 TIMES PROJECT (2004) and BRAZIL 3 TIMES (2007), it was noted that no use was made of interactive and participative methods and techniques of debate, analysis or exploratory study involving a wide variety of stakeholders. Thus, they did not take into account important aspects of foresight studies, according to MARTIN (2001),

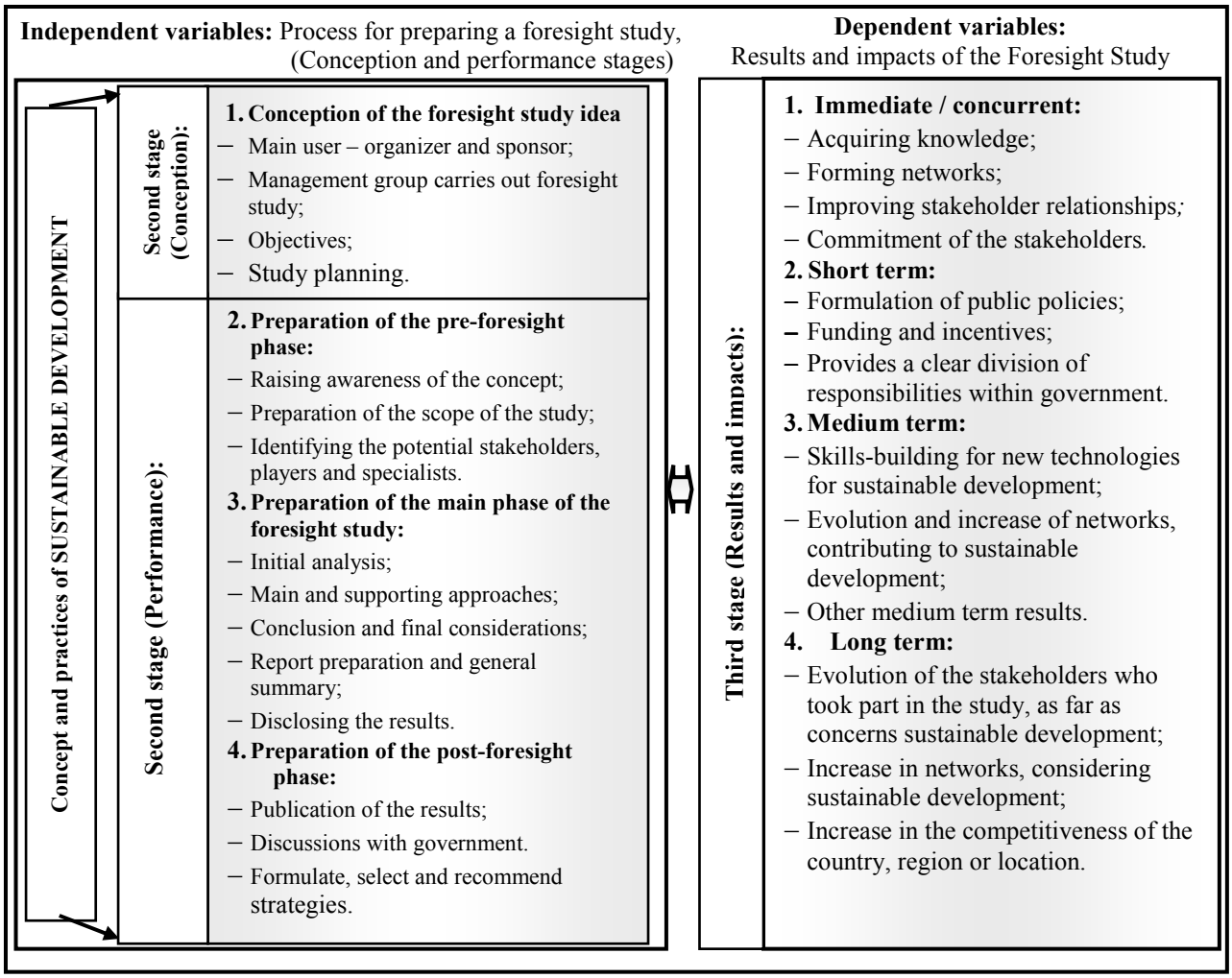
such as making the studies systematic, increasing knowledge in proportion to Brazil's dimension, forming networks, obtaining active participation of the stakeholders in the various phases of the studies, and having the results support the formulation of public policies; furthermore, no assessment of the studies was carried out.

3. Methodology

For YIN (1994, p. 9-10), the prejudice against case study research results from past researchers having been negligent and accepted incorrect evidence or biased views that have had an influence on the meaning of the findings and conclusions.

This research is classified as an exploratory case study. A research model was prepared, as shown in Figure 1, based on the bibliographic research.

Figure 1: Relationship between procedures and results in the foresight study process



SOURCE: AULICINO (2006) with help from Attila Havas

To help advance administration knowledge in this area, the Figure 1 research model was prepared with the aim of understanding how the process of designing and executing a foresight study has an impact on its effectiveness as a tool for formulating public policies within the context of sustainable development.

The variables and their respective indicators were set out in this model (Figure 1).

The independent variables are the first and second stages, which consider the Concept and Practices of Sustainable Development and include the following variables:

- The concept and practices of sustainable development were considered in the conception and performance of the foresight study in accordance with the Brundtland Commission report, OUR COMMON FUTURE (1987). The Commission defines *sustainable development* as "development that meets the *needs* of the present without jeopardizing the ability of future generations to meet their own *needs*";
- The first stage, which contains the independent variable: 1) conception of the idea of the foresight study, having as its indicators: the main user, the management group, the objectives and planning of the foresight study, according to BARRÉ (2001), MARTIN (2001) and HAVAS (2003);
- The second stage is the process of carrying out the foresight study and this contains the independent variables: 2) preparation of pre-foresight aspects, 3) preparation of the main foresight study, and 4) preparation of post-foresight aspects, according to BARRÉ (2001), MARTIN (2001) and HAVAS (2003). Each one of these variables has its respective indicators.

The dependent variable, as a consequence of the independent variable, has a third stage, which contains the result and impact variables arising from the conception and performance of the foresight study and that are influenced by the concept and practices of sustainable development. The dependent variables are: 1) immediate or concurrent or concomitant results and impacts, 2) short term results and impacts, 3) medium term results and impacts, and 4) long term results and impacts. These variables check to what extent the country, region or location takes advantage of the value of the foresight study. The value may be direct and related to the future vision and the definition of the public policies arising from the process, according to BARRÉ (2001) and HAVAS (2003), or indirect, relating to the benefits that the process provide, according to MARTIN (2001, p. 7), which may be summarized in the 5 **C**s: **C**ommunication, **C**oncentration over the long term, **C**oordination in a network, **C**onsensus and **C**ommitment to implementing the results.

For each variable of each stage indicators and their respective sub-indicators were considered.

The case study chosen, the Brazilian Program of Industrial Technological Prospective, was Brazilian in scope and its objective was to support public policies for science, technology and innovation, considering four foresight studies in sectors covering the Brazilian territory. This case study is divided into four other case studies, which are prospective studies of productive chains: transformed plastics, civil construction, textiles and clothes manufacturing and furniture and wood.

The Brazilian Program of Industrial Technological Prospective was coordinated by the Department of Industrial Technology (*DIT*) of the Ministry of Development, Industry and Foreign Trade (*MDIFT*); it started in 2000, was finalized in 2003 and was partly sponsored by UNIDO (United Nations Industrial Development Organization).

The criterion used is intentional, without any concern with randomness, i.e., there is a search for analytical generalization (strengthening theories on the topic, or not).

The Brazilian Program of Industrial Technological Prospective was chosen for this study because it was one of the pioneers nationally and because it included four prospective studies, three of which were finalized and published. The prospective studies were prepared in the productive chains, covered by an entity called the Productive Chain Competitiveness

Forum that has labor, business and government representatives. Furthermore, this Program made available recent secondary data, enabling one to carry out a complete analysis of the process.

The primary data for this research were collected via in-depth interviews. Secondary data were collected from documents provided by the coordinator of the Brazilian Program of Industrial Technological Prospective, the Chief of Office of the Ministry (*DIT/MDIFT*), who supplied the following information: the result of the meetings with UNIDO; the contract between the entities; the minutes of the meetings of the Prospective Committee; the discussions about the productive chains and the topics; the planning of the training course of the teams of the four Productive Chains that prepared the prospective studies; the evaluations and various presentations of the teams; the development of each prospective study and the difficulties and all the reports prepared by the teams in all phases of the Program.

4. Results and policy impact/implications

The results were a consequence of the way in which the prospective studies of the Program of Industrial Technological Prospective were prepared. Both the positive results, which aid the country's development, and those that allow for learning because of possible failures, are presented, so that the processes can be improved in the next prospective studies.

In the context in which they were prepared, the future studies of the Brazilian Program of Industrial Technological Prospective provide a good national experience involving four productive chains (transformed plastics: plastic packaging for food; civil construction: building housing; textiles and clothes manufacturing: knitwear; and furniture and wood); the people in these productive chains; and the challenge of preparing future studies using experts in the productive chains chosen who were unfamiliar with the process of preparing prospective studies.

The output obtained resulted from the way in which the process for preparing the future studies was conducted, showing the relationship between the independent variables (conception and performance phases of the foresight study*)* and the dependent variables (results and impacts). Based on these relationships, the reasons why the results were achieved or not were identified. The positive results that in some way contributed to the development of Brazil and to the expansion of knowledge of the people involved in the process of preparing these studies were noted. It was also possible to identify the situations and reasons that may have compromised the expected results, in order to improve further future studies.

The positive results that contributed to the country's development can be summed up as follows:

- Building awareness among members of the Productive Chain Competitiveness Forums about the notion of future studies, with the objective that they concern themselves with planning the future and that this be linked to day to day reality;
- The establishment of Committees of Prospective per Productive Chain, trying to select different stakeholders so that together they might define the objectives of future studies;
- Preparation of the ACTION PLAN (2000), which shows the wishes of the Competitiveness Forums for each productive chain selected; the process of preparing the prospective studies; the concerns about the links between these productive chains; and the expectations for these studies' results;

- Enhanced competence in the process of preparing future studies for Brazil, creating knowledge among the partner institutions that prepared the prospective studies, through their respective coordinators;
- The acquiring of knowledge by the representatives of academia and government in the process of preparing the future studies;
- Any prospective studies to be prepared by the *MDIFT* will be delegated to the *CMSS*;
- An increase in the interaction between the representatives of academia and government during the process of preparing the future studies;
- The results of the prospective study of the civil construction productive chain that contributed, in an indirect way, to preparation of Resolution 3177/2004 from *BACEN (Central Bank)*, which tried to discourage banks from retaining savings funds, by reducing the return, obliging them to pass them on as funding for civil construction, thereby increasing the availability of funding for the purchase of private housing; and Law 10,931/2004, which increased legal security for stakeholders in the real estate development business and introduced a simpler way of prepaying federal taxes and contributions for real estate development projects, according to CBIC (2004);
- Participation of the government in the management and running of the Brazilian Program of Industrial Technological Prospective;
- Preparation of the seminar "Business Strategies, Brazilian Industrial Policy and New Approaches to Promoting Competitiveness" for companies, held at FIESP, especially for decision-makers, with the aim of strengthening activities concerning thoughts and the debate about the future and broadening the scope of such activities in the business environment. Various stakeholders took part in the event and there was a significant presence from the business sector, from which most of the decision-makers were drawn;
- The prominence given by the transformed plastics Productive Chain Competitiveness Forums to the future study prepared for it, in a note 29/05/QUI dated 4/13/2005, which served as the basis for a demand forecast for the sector.
- The future studies of the three productive chains (transformed plastics, civil construction and textiles and clothing manufacturing) highlighted the need for technological training in the country.

One should stress that the Brazilian Program of Industrial Technological Prospective was the first, on a national scale, to end with three complete prospective studies, whose results depended on the way in which the future studies were designed and performed. Therefore, future studies must be prepared in systematically and continuously, so that the learning and the failings may be applied to subsequent studies for the conception and performance learning-curve to evolve. This happened in the foresight studies prepared in the European Union, particularly in the UK, which in its third foresight study was still working on perfecting conception and performance, precisely to improve with every new study, which led it to prepare a foresight studies' assessment report. Japan also has a tradition in the preparation of foresight studies, preparing them every five years for the national plan.

5. Conclusions and recommendations

To help perfect the process of preparing future studies in Brazil, we list below some of the situations that may improve the results of the next prospective studies:

- Avoiding changes in the focus when carrying out future studies of productive chains for the Competitiveness Forum, as from the second stage of the ACTION PLAN (2000) prepared in the first stage. In the Action Plan there was a scheme called Competitiveness Factors, in which the consultant helping to prepare the Plan highlighted the learning triangle, which

was concerned with people and the establishment of knowledge networks and identified desirable innovations in the future vision. This proposition of the ACTION PLAN (2000) could be used regardless of the approaches employed in the process for preparing the productive chain prospective studies;

- Avoid restricting the training course in future studies to academia and the government, thereby making it difficult to extend knowledge to other stakeholders. Ignorance about the concepts of future studies compromised the sharing and involvement of other stakeholders in the final results because they were unaware of the concepts;
- Consider sustainable development in the objectives of future studies. This fact may have been the reason why various stakeholders did not participate, particularly NGOs and representatives from society in general. Brazil is a country that ought to be concerned with sustainable development in all its future plans, , because of its dimensions and wealth, as the European Union is in its public policies;
- Consider the formation of networks, which was a concern of the ACTION PLAN (2000), because the process for preparing future studies did not provide for an inter-relationship between the various stakeholders or their involvement with the process of preparing the prospective studies;
- Include other stakeholders in the process of preparing foresight studies, because there were improvements in the relationship between the few government and academia representatives;
- Various stakeholders only took part twice during the process of preparing future studies: a) in the Prospective Committees; and b) in the *Delphi* questionnaires*,* to which responses were individual. Therefore, many stakeholders did not take part in the whole study preparation process, which made the inter-relationship and understanding between them difficult;
- Extend the participation of the stakeholders in the foresight study preparation process, which was limited and did not lead to commitment to the results and implementation, according to MARTIN (2001);
- Encourage the participation of decision-makers from the various organizations that the different stakeholders represent. As they did not take part in the study preparation process, there was no commitment or involvement and the preparation process was not taken back to their organizations to adjust them to the results of the future studies;
- There was a reduction in the meetings of the Competitiveness Forum of the civil construction productive chain because of the creation of the Cities Ministry by the federal government from 2003 to 2006, which became interested in the results of the future study of this particular productive chain. However, in one of this Forum's meetings a proposal was put forth to create a market studies intelligence center (a future studies observatory) in a body outside the State apparatus;
- Increase the funding and incentives for technology that takes sustainable development into account, which did not occur because the future studies did not consider sustainable development. Of the three dimensions, economic, social and environmental, the economic one was the most emphasized;
- The results of future studies should consider actions such as: process continuity in the implementation of the results, absorption of prospective concepts by the business sector, as suggested by UNIDO, and formulation of public policies for the productive chains studied;
- The decision-makers in the seminar "Business Strategies, Brazilian Industrial Policy and New Approaches to Promoting Corporate Competitiveness" accounted for 7.8% of the total number who attended it, and its objective was to ensure corporate involvement in the results of future studies. This percentage showed that it is difficult to change the habits of business-people if they do not participate in the preparation process and do not absorb knowledge from preparing these studies, the aim being to understand how this process

happens and to use it for formulating strategies within their own organizations, by identifying future opportunities and threats.

One can conclude that the Brazilian Program of Industrial Technological Prospective generated positive results that aided the country's development in the productive chains studied. However, there is much to be done in order to reach the standards of the European Union, which knows how to take advantage of investments in foresight studies, implementing their results and making the most of them in terms of formulating strategies both in the countries that prepared them and in the organizations that took part in the foresight study preparation process.

The Brazilian government had difficulty using foresight study results for formulating public policies, mainly because of the difficulty in involving the various stakeholders in the process of preparing these studies in an interactive and participative way. This means that new social networks are not generated, but they are just as important as the formal output of the studies, according to FOREN (2001). This process takes time and must be persistent and continuous, as the European Union has shown in its several foresight studies over the last few years.
One should point out that the future studies did not take into account sustainable development in an egalitarian way in their economic, social and environmental dimensions. Greater emphasis was given to the economic dimension, to the detriment of the social and environmental dimensions.

The results of the foresight studies prepared (made) or under way in Brazil provide for no participation or sharing of the strategic vision of the future study, making it difficult to achieve commitment when using the study results and success in the formulation of public policies.

As a consequence of the results, we recommend that the Foresight Study preparation process be participative and involve the stakeholders, in order to improve the conception and performance of the process and to obtain better results, capable of truly providing support for public policies.

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